

P/ INT COOPERATION TREAT

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NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Assistant Commissioner for Patents
United States Patent and Trademark
Office
Box PCT
Washington, D.C.20231
ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 04 September 2000 (04.09.00)	
International application No. PCT/GB00/00094	Applicant's or agent's file reference P006185WO MP
International filing date (day/month/year) 14 January 2000 (14.01.00)	Priority date (day/month/year) 19 January 1999 (19.01.99)
Applicant HORNE, David et al	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:

13 August 2000 (13.08.00)

☐ in a notice effecting later election filed with the International Bureau on:
2. The election ☒ was
☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Facsimile No.: (41-22) 740.14.35

Authorized officer

Zakaria EL KHODARY

Telephone No.: (41-22) 338.83.38

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PATENT COOPERATION TREATY

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

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To:	
BODEN, K. McMurphy	AGENCY £
D. Young & Co.	ORDER P/6185.000
21 New Fetter Lane	RECEIVED - 8 MAY 2001
London EC4A 1DA	ENTRY
GRANDE BRETAGNE	FOR DS AP

NOTIFICATION OF TRANSMITTAL OF INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Rule 71.1)

Date of mailing
(day/month/year)

04.05.01

Applicant's or agent's file reference
P006185WO KMB

IMPORTANT NOTIFICATION

International application No.

PCT/GB 00/ 00094

International filing date (day/month/year)

14/01/2000

Priority date (day/month/year)

19/01/1999

Applicant

APW ELECTRONICS LIMITED et al.

- The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
- A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
- Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.
- REMINDER**
The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices)(Article 39(1))(see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

Name and mailing address of the IPEA/



European Patent Office
D-80298 Munich
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Authorized officer



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PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT



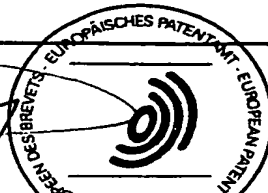
(PCT Article 36 and Rule 70)

14

Applicant's or agent's file reference P006185WO KMB	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/GB 00/ 00094	International filing date (day/month/year) 14/01/2000	Priority date (day/month/year) 19/01/1999
International Patent Classification (IPC) or national classification and IPC H02B1/38		
Applicant APW ELECTRONICS LIMITED et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This **REPORT** consists of a total of 5 sheets, including this cover sheet.
- ☒ This report is also accompanied by **ANNEXES**, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).
- These annexes consists of a total of 2 sheets.

3. This report contains indications relating to the following items:
- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 13/08/2000	Date of completion of this report 04. 05. 01
Name and mailing address of the IPEA/  European Patent Office D-80298 Munich Tel. (+ 49-89) 2399-0, Tx: 523656 epmu d Fax: (+ 49-89) 2399-4465	Authorized officer  P. Le Guay 

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I. Basis of the report

1. This report has been drawn up on the basis of *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.)*

☐ the international application as originally filed

☒ the description, pages 1-5, as originally filed
pages, filed with the demand
pages, filed with the letter of

☒ the claims, Nos., as originally filed
Nos., as amended under Article 19
Nos., filed with the demand
Nos. 1-11, filed with the letter of 13.03.01

☒ the drawings, sheets / fig. 1/4-4/4, as originally filed
sheets / fig., filed with the demand
sheets / fig., filed with the letter of

2. The amendments have resulted in the cancellation of:

☐ the description, pages:

☐ the claims, Nos.

☐ the drawings, sheets / fig.

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2 (c)).

4. Additional observations, if necessary:

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V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty	Claims	1-11	YES
	Claims	None	NO
Inventive Step	Claims	1-11	YES
	Claims	None	NO
Industrial Applicability	Claims	1-11	YES
	Claims	None	NO

2. Citations and Explanations

1. Concerning Claim 1

- (a) Claim 1 relates to a hinge connection having a hinge arm, a hinge pin and a hinge recess with a guiding corner to which the hinge pin is slideably seated;
- (b) document DE-A-2322 258 which discloses such an arrangement is considered to be the nearest prior art;
- (c) the purpose of the invention is to enable an easier mounting of a door comprising a part of said hinge connection on a cabinet comprising the other part of it;
- (d) said purpose is achieved by the provision of a spacing member protruding radially beyond the hinge pin thereby enabling to guide the spacing member with respect to the guiding corner so that the hinge arm is in a seated engagement with the corner in a first position and is seated out of engagement in the second final position;
- (e) such a feature is novel with respect to the known prior art and is considered to involve an inventive step;
- (f) therefore claim 1 complies with the requirements of Article 33(2) and (3) PCT.

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2. Concerning Claims 2 to 11

These dependant claims disclose particular embodiments of the invention and are to be equally considered as novel and inventive in terms of Article 33(2) and (3) PCT.

3. The industrial applicability of the hinge connection according to claims 1 to 11 is obvious.

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VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

- (1) Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the document DE-A-2322 258 is not mentioned in the description, nor is this document identified therein.
- (2) Independent claim 1 is not in the two-part form in accordance with Rule 6.3(b) PCT, which in the present case would be appropriate, with those features known in combination from the prior art (document DE-A-2322 258) being placed in the preamble (Rule 6.3(b)(i) PCT) and with the remaining features being included in the characterising part (Rule 6.3(b)(ii) PCT).

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CLAIMS

1. A hinge connection, comprising:
a hinge arm (1) including a hinge pin (16) at an end thereof; and
5 a hinge recess (2) including a hinge hole (28) for receiving the hinge pin (16)
and a corner for guiding the hinge arm (1) to a first position in which the hinge
arm (1) is seated in the corner and from which the hinge arm (1) is slidable
relative to the hinge recess (2) along the corner to a second position in which the
hinge pin (16) is inserted in the hinge hole (28);
10 wherein the hinge arm (1) includes a spacing member (15) which protrudes
radially beyond the hinge pin (16), and, in the first position, is in seated
engagement with the corner, with the hinge pin (16) spaced from the corner, and,
in the second position, is spaced from the corner, and the end of the hinge pin
15 (16) includes a chamfer (161) such that, during movement from the first position
to the second position, the chamfer (161) guides the hinge arm (1) out of seated
engagement with the corner.
2. A hinge connection according to claim 1, wherein the spacing member (15) has
a cylindrically curved surface.
20
3. A hinge connection according to claim 2, wherein the spacing member (15) has
a surface which is circumferentially a complete cylinder.
4. A hinge connection according to any of claims 1 to 3, wherein the hinge arm (1)
25 includes a main arm portion (11), and the spacing member (15) and the hinge pin
(16) are integrally formed and rotatably mounted at an end of the main arm
portion (11).
5. A hinge connection according to any of claims 1 to 4, wherein the spacing
30 member (15) is contiguous with the hinge pin (16).
6. A hinge connection according to any of claims 1 to 5, wherein the hinge recess

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(2) includes guide surfaces (22, 231), and the corner is a groove defined by the guide surfaces (22, 231), against which the hinge arm (1) is seated when in the first position.

- 5 7. A hinge connection according to claim 6, wherein the hinge recess (2) includes an end surface (25), and the hinge hole (28) is disposed in the end surface (25) at an end of the groove.
- 10 8. A hinge connection according to claim 6 or 7, wherein the guide surfaces (22, 231) are planar.
9. A hinge connection according to claim 8, wherein the guide surfaces (22, 231) are generally orthogonal.
- 15 10. A hinge connection according to claim 9, wherein the end surface (25) is orthogonal to the guide surfaces (22, 231).
- 20 11. An electrical cabinet for electronic and electrical components, comprising a hinge connection according to any of claims 1 to 10, and a frame including a frame member (31) including the hinge arm (1) and a removable door panel (32) including the hinge recess (2).

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INTERNATIONAL COOPERATION TREATY

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INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference P006185W0 MP	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/GB 00/ 00094	International filing date (day/month/year) 14/01/2000	(Earliest) Priority Date (day/month/year) 19/01/1999
Applicant APW ELECTRONICS LIMITED et al.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 2 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the language, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

b. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international search was carried out on the basis of the sequence listing :

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ Certain claims were found unsearchable (See Box I).

3. ☐ Unity of invention is lacking (see Box II).

4. With regard to the title,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the abstract,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the drawings to be published with the abstract is Figure N .

☒ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

4

☐ None of the figures.

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INTERNATIONAL SEARCH REPORT

International Application No.

/GB 00/00094

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 H02B1/38 E05D7/10

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H02B E05D H05K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 197 08 061 A (RAMSAUER DIETER) 30 October 1997 (1997-10-30) column 6, line 42 - line 68 column 7, line 56 - column 8, line 25	1
A	DE 23 22 258 A (BOERLIN BAUMANN WALTER) 29 November 1973 (1973-11-29) page 2, paragraph 3 - page 3, paragraph 1	1

☐ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

* Special categories of cited documents:

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- "&" document member of the same patent family

Date of the actual completion of the international search

29 March 2000

Date of mailing of the international search report

05/04/2000

Name and mailing address of the ISA

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NL - 2280 HV Rijswijk
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Authorized officer

Dailloux, C

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 00/00094

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 19708061 A	30-10-1997	DE 29604684 U	10-07-1997
DE 2322258 A	29-11-1973	CH 538038 A	31-07-1973

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INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 7 :

H02B 1/38, E05D 7/10

A1

(11) International Publication Number:

WO 00/44076

(43) International Publication Date:

27 July 2000 (27.07.00)

(21) International Application Number: PCT/GB00/00094

(22) International Filing Date: 14 January 2000 (14.01.00)

(30) Priority Data:

9901144.7

19 January 1999 (19.01.99)

GB

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(72) Inventors; and

(75) Inventors/Applicants (for US only): HORNE, David [GB/GB]; 11 Pine Close, South Wonston, Hampshire SO21 3EB (GB). SCHNABEL, John, David [GB/GB]; 11a Berkeley Close, Hill Head, Fareham, Hampshire, PO14 3NW (GB).

(74) Agent: PURVIS, William, Michael, Cameron; D Young & Co., 21 New Fetter Lane, London EC4A 1DA (GB).

(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

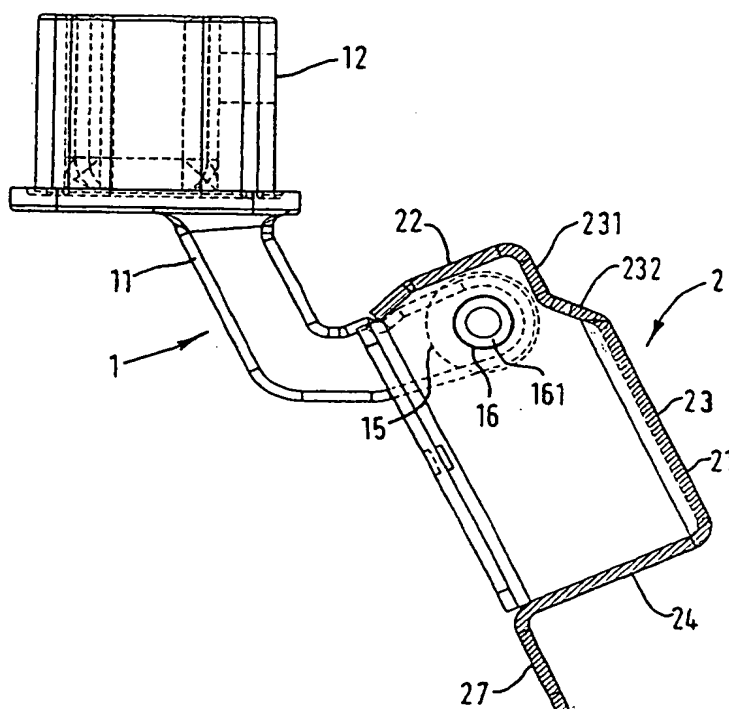
Published

With international search report.

(54) Title: HINGE CONNECTION

(57) Abstract

A spacing member (15) on a hinge arm (1) bears against guide surfaces (22, 231) and locates a hinge pin (16) generally beneath a hinge pin hole in a recess (2) to be mounted on a door to be hingedly mounted on a cabinet which has a frame mounting the hinge arm. Lowering of the recess when so generally located cause a chamfer (161) on the end of the hinge pin (16) to accurately align the hinge pin with the hinge pin hole as the hinge pin (16) enters the hinge pin hole to move the spacing member (15) out of engagement with the guide surfaces (22, 231).



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HINGE CONNECTION

This invention relates to a hinge connection particularly but not exclusively suited for forming a hinge connection between a frame of an electrical cabinet and a removable door panel thereof.

Electrical cabinets generally comprise a frame for receiving sub-racks of electrical and electronic components, and other items such as cooling fans. The frame is clad in side panels and an openable door panel. These panels are usually removable in order to facilitate the fitting of the components to the frame during initial manufacture, and also to facilitate in-use servicing of the components. The cabinet can be quite tall (typically 2 metres) and therefore the removable door panel can be quite bulky and also quite heavy, and is accordingly sometimes difficult for a person to position accurately when trying to fit the door panel onto the frame by aligning the hinge pins of the frame with hinge holes formed in the door panel.

According to a first aspect of the present invention, there is provided a hinge connection comprising:

a hinge arm at the end of which is a hinge pin; and

a hinge recess having a corner for guiding the hinge arm to a first position at which the hinge arm is seated in the corner and from which the hinge arm is slidable relative to the hinge recess along the corner to a second position to insert the hinge pin into a hinge hole of the recess whilst unseating the hinge arm from the corner, the end of the pin being chamfered such that, during the movement from the first position to the second position, the chamfer guides the hinge arm out of seated engagement with the corner of the recess.

Because the corner of the hinge recess guides the hinge arm to the first position, it becomes easier to fit a door panel incorporating the hinge recess onto a cabinet frame incorporating the hinge arm. Usually, the operator needs only to achieve general approximate alignment of the hinge arm with the hinge recess, before pressing the door panel with the hinge recess onto the hinge arm to achieve the necessary correct alignment represented by the first position. The operator may then release the weight of the door panel and the weight of the door panel will cause it to

drop downwards, producing movement from the first position to the second position at which the hinge pin is correctly received in the hinge hole. During this movement, the hinge arm that was previously seated in the corner is unseated therefrom, so that during use of the hinge there will be no unwanted frictional rubbing of the hinge arm on the corner of the hinge recess. Thus, the seating function of the hinge arm in the
5 recess is provided only when it is needed (during assembly of the hinge connection) and is dispensed with when it is no longer needed (during subsequent use of the hinge connection).

The degree of the chambering of the pin can be matched to the amount of
10 unseating of the hinge arm from the corner that is required.

Whilst in some embodiments the hinge pin itself may be the component of the hinge arm which seats in the corner of the hinge recess, it is preferred that the hinge arm has a spacing member which:

- protrudes radially beyond the hinge pin;
- 15 in the first position is in seated engagement with the corner of the recess whilst spacing the hinge pin away from the corner; and
- in the second position is no longer in seated engagement with the corner.

In many embodiments, the spacing member has a cylindrically curved surface. This surface may be only partially annular, but in many embodiments it may be a
20 complete annulus such that the spacing member has a spacing surface which is circumferentially a complete cylinder.

In some embodiments, the hinge pin will be freely rotatable in a main arm portion of the hinge arm. In other embodiments, the spacing member is integral with the hinge pin and these components are rotatably mounted at the end of a main arm
25 portion of the hinge arm.

According to a further aspect of the present invention, there is also provided an electrical cabinet for electronic and electrical components, comprising a hinge connection as described above and a frame having a frame member at the end of which is the hinge arm and a removable door panel including the hinge recess.

30 A non-limiting embodiment of the present invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

Fig. 1 is a perspective view of a hinge arm of a hinge connection in accordance with the present invention;

Fig. 2 is a perspective view of a hinge recess of the hinge connection;

Fig. 3 is a perspective view of the hinge connection when in use, with the hinge arm fitted to a frame of an electrical cabinet and the hinge recess fitted to a removable door panel of the electrical cabinet; and

Fig. 4 is a plan view of the assembled hinge connection, showing the slight unseating that occurs in the second position.

The hinge connection comprises a hinge arm 1 shown in Fig. 1 and a hinge recess 2 shown in Fig. 2 which functions as a socket for receiving the hinge arm 1.

The hinge arm 1 comprises a main arm portion 11 which projects from a base 12 shaped for functioning as an end cap for insertion into the end of a structural frame member of a frame of an electrical cabinet. The main arm portion 11 is curved and at its free end it rotatably carries a pin assembly 13 comprising a shaft 14, a collar 15 and a pin 16. The shaft 14 is rotatably received in a vertical through hole 17 at the free end of the main arm portion 11. The collar 15 rests on the top surface of the main arm portion 11.

The shaft 14, collar 15 and pin 16 are integral with one another so that the pin assembly 13 rotates as a single unit.

The hinge recess 2 comprises a box-like body 21 having three main side walls 22, 23 and 24. There are also top and bottom walls 25, 26. Flanges 27 are folded outwardly from the walls 24, 25 and 26. The three flanges 27 lie in a common plane and two of them have apertures 29 to enable the hinge recess 2 to be fitted to a removable door panel.

A portion 231 of the side wall 23 is higher than the rest of the base of the body and is linked to the main part of the side wall 23 by a sloping connecting portion 232 of the side wall 23.

A hinge hole 28 is provided in the top wall 25.

During insertion of the hinge arm into the hinge recess, the operator needs to aim the hinge arm only generally towards the corner containing the hinge hole 28 because if, as viewed in Fig. 2, the hinge arm 1 is too far over to the left the collar

15 will impact on the inner face of the side wall 22 and be deflected towards the right to end up at a first position at which the pin 16 is generally aligned under the hole 28.

5 If the hinge arm enters the hinge recess too far over to the right, as viewed in Fig. 2, the collar 15 will impact on the side wall portion 231 and be deflected or guided slightly leftwards so that, by the time the collar 15 reaches the bottom of the groove defined by the side wall 22 and side wall portion 231, the pin 16 will be correctly generally aligned under the hinge hole 28.

10 The inner face of the side wall 22 and the inner face of the side wall portion 231 are generally elongate planar surfaces that are orthogonal to one another so as to define the groove into which the collar 15 is seated when the hinge arm reaches a first position in the hinge recess. In this first position, the pin 16 is spaced away from the hinge recess 2.

15 Relative movement is then produced between the hinge arm 1 and hinge recess 2 such that the collar 15 slides along the base of the groove in which it is seated, to start to insert the pin 16 in the hinge hole 28. In the first position, the longitudinal axis of the pin 16 is slightly lower down in the groove than the axis of the hinge hole 28. Consequently, a chambered leading edge 161 of the pin 16 is used to lift the pin 16 slightly up in the groove and into correct alignment with the axis of the hinge hole 20 28 as the pin proceeds fully into the hole as the hinge arm reaches its second, final position. Because of the lifting action of the leading edge 161, the collar 15 is unseated from the groove defined by the side wall 22 and side wall portion 231. This is so that, in use, there is no unwanted frictional rubbing of the hinge recess 2 against the cylindrical side surface of the collar 15.

25 In the second, final position achieved at the end of the assembly operation, the top wall 25 rests on the top end surface of the collar 15 which thereby acts as a shoulder.

It may be seen that the collar 15 acts a spacing member in the first position, for spacing the pin 16 away from the guide surfaces of the groove in the corner of 30 the hinge recess 2, whilst generally correctly positioning the pin 16 under the hole 28 ready for its insertion into that hole upon movement from the first position to the

second position.

The side wall 22, side wall portion 231 and top wall 25 are mutually orthogonal. This is the preferred arrangement. In an alternative, the internal angle between the side wall 22 and side wall portion 231 could be greater or less than 90° as long as the function is achieved of correctly guiding the hinge arm to its first, seated position in the corner of the hinge recess under the hinge hole 28.

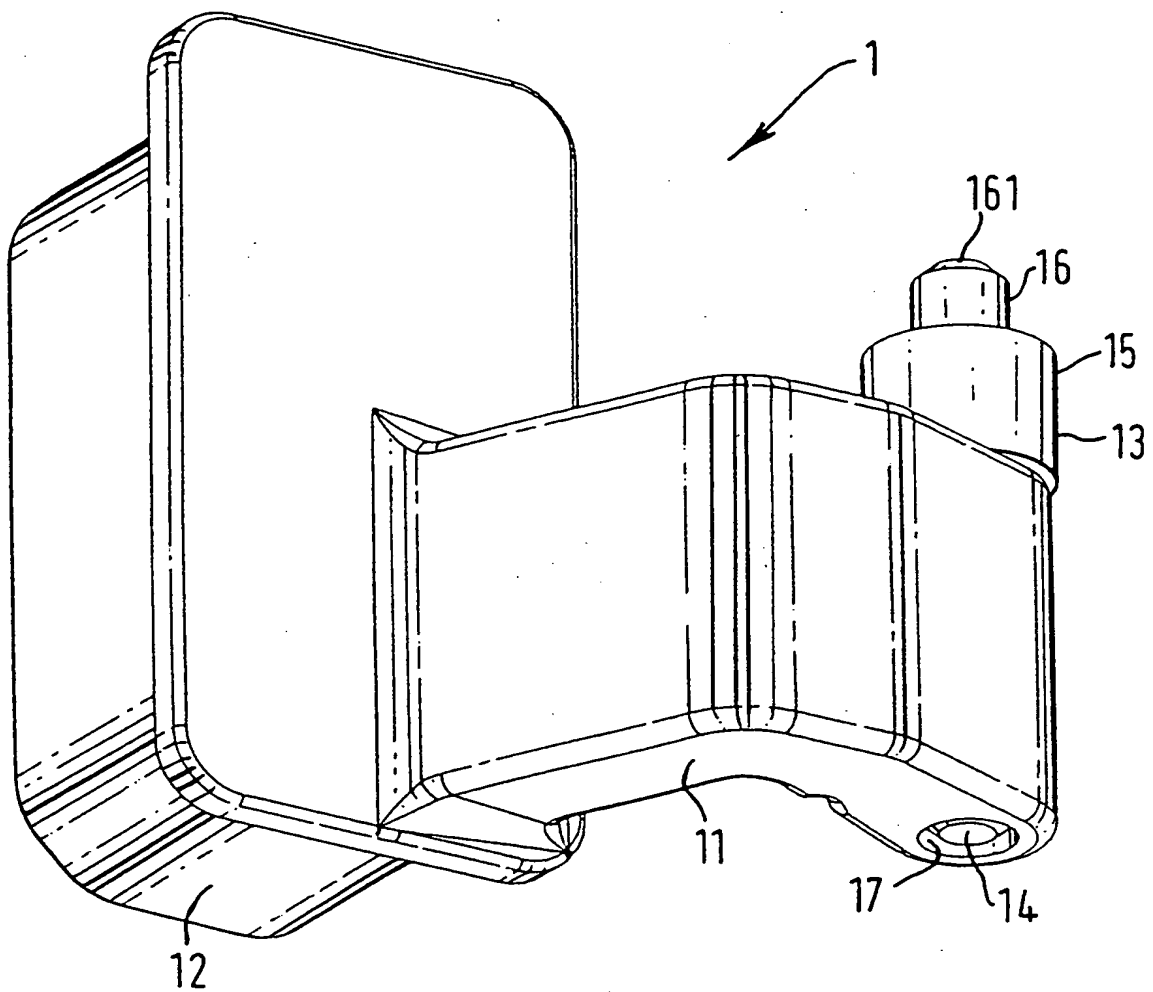
Fig. 3 shows how the hinge connection of the present embodiment may be used. The base 12 is inserted into the end of a structural frame member 31 of the frame of an electrical cabinet. The hinge recess 2 is inserted into a side strengthening member 32 of a removable door panel of the electrical cabinet. Thus, in use, the hinge arm 1 will be static and it is the hinge recess 2 which moves relative to the hinge arm 1. Therefore, when moving to the first position, the operator looks to ensure that a pushing motion will generally insert the pin assembly 13 into the corner of the hinge recess under the hinge hole 28. Precise alignment is not required before the pushing operation commences, because the collar 15 will be guided by the side wall 22 and side wall portion 231 to the correct position. Then, the operator can release the weight of the door panel and produce the relative sliding movement from the first position to the second, final position at which the pin 16 is fully received in the hinge hole 28 and the collar 15 has lifted slightly clear from being seated in the corner of the hinge recess.

CLAIMS

1. A hinge connection comprising:
 - a hinge arm (1) at the end of which is a hinge pin (16); and
 - 5 a hinge recess (2) having a corner (22, 231) for guiding the hinge arm (1) to a first position at which the hinge arm (1) is seated in the corner (22, 231) and from which the hinge arm (1) is slidable relative to the hinge recess (2) along the corner (22, 231) to a second position to insert the hinge pin (16) into a hinge hole (28) of the recess (2) whilst unseating the hinge arm (1) from the corner (22, 231), the end
 - 10 of the pin (16) being chamfered (161) such that, during the movement from the first position to the second position, the chamfer (161) guides the hinge arm (1) out of seated engagement with the corner (22, 231) of the recess (2).
2. A hinge connection according to claim 1, wherein the hinge arm (1) has a
- 15 spacing member (15) which:
 - protrudes radially beyond the hinge pin (16);
 - in the first position is in seated engagement with the corner (22, 231) of the recess (2) whilst spacing the hinge pin (16) away from the corner (22, 231); and
 - in the second position is no longer in seated engagement with the corner
 - 20 (22, 231).
3. A hinge connection according to claim 2, wherein the spacing member (15) has a cylindrically curved surface.
- 25 4. A hinge connection according to claim 3, wherein the spacing member (15) has a surface which is circumferentially a complete cylinder.
5. A hinge connection according to claim 4, wherein the spacing member (15) is integral with the hinge pin (16) and these components are rotatably mounted at the
- 30 end of a main arm portion (11) of the hinge arm (1).

6. A hinge connection according to any one of claims 2 to 5, wherein the spacing member (15) is contiguous with the hinge pin (16).
7. A hinge connection according to any preceding claim, wherein the corner of the recess (2) comprises guide surfaces (22, 231) which define a groove (22, 231) and against which the hinge arm (1) seats when in the first position.
8. A hinge connection according to claim 7, wherein the hinge hole (28) is provided in an end surface (25) at an end of the groove (22, 231).
9. A hinge connection according to claim 7 or 8, wherein the guide surfaces (22, 231) are planar.
10. A hinge connection according to claim 9, wherein the guide surfaces (22, 231) are generally orthogonal.
11. A hinge connection according to claim 10, wherein the end surface (25) is orthogonal to the guide surfaces (22, 231).
12. An electrical cabinet for electronic and electrical components, comprising a hinge connection according to any preceding claim and a frame having a frame member (31) at the end of which is the hinge arm (1) and a removable door panel (32) including the hinge recess (2).

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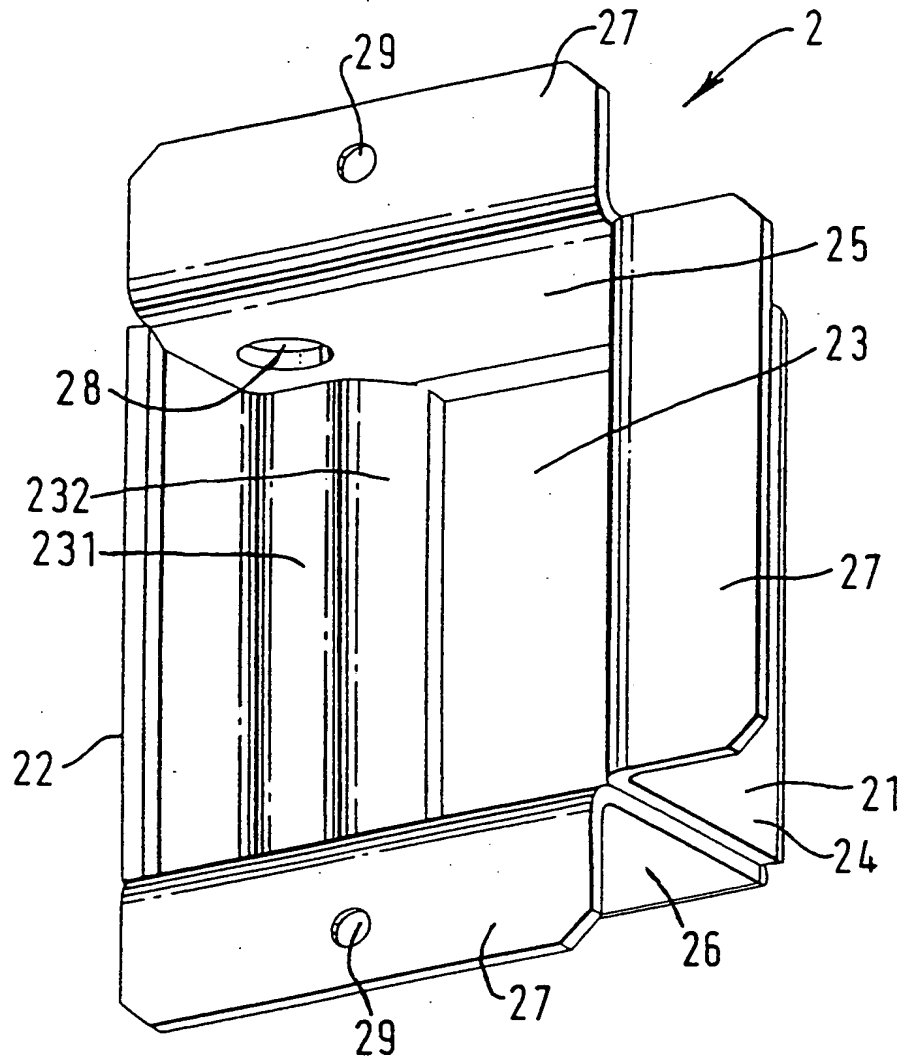
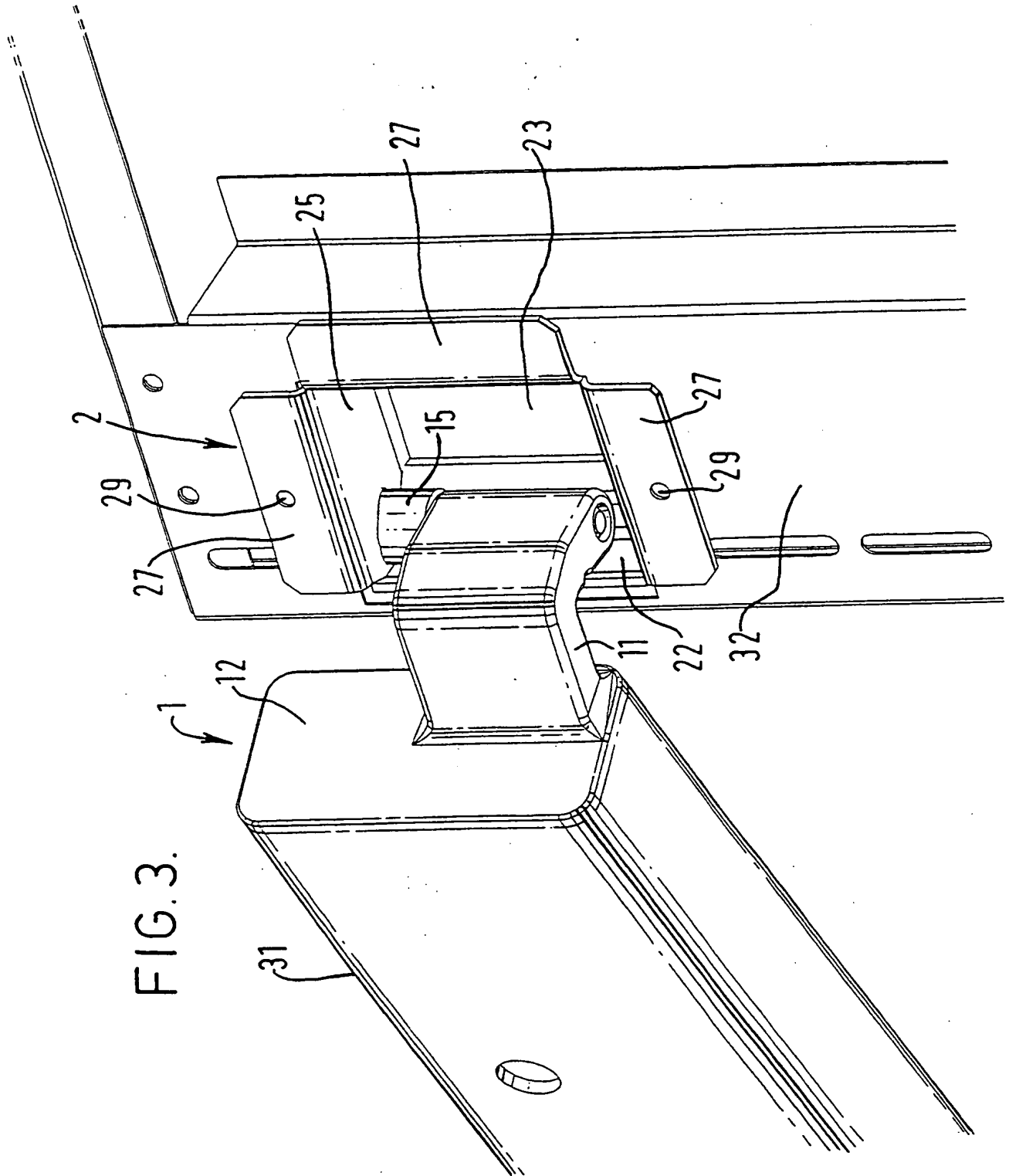


FIG.2.

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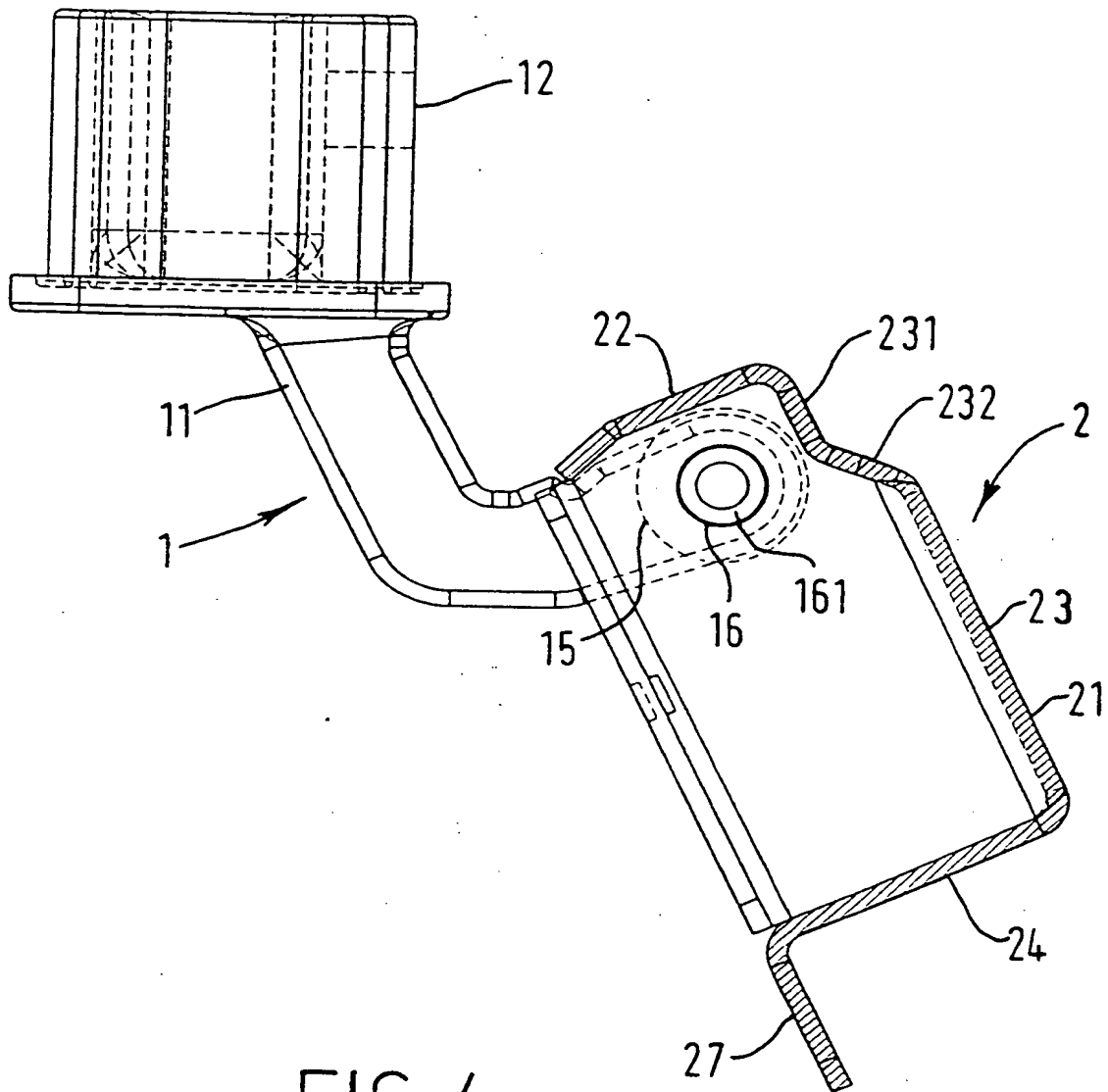


FIG. 4.

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INTERNATIONAL SEARCH REPORT

International Application No.

PCT/GB 00/00094

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H02B1/38 E05D7/10

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H02B E05D H05K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 197 08 061 A (RAMSAUER DIETER) 30 October 1997 (1997-10-30) column 6, line 42 - line 68 column 7, line 56 - column 8, line 25	1
A	DE 23 22 258 A (BOERLIN BAUMANN WALTER) 29 November 1973 (1973-11-29) page 2, paragraph 3 - page 3, paragraph 1	1

☐ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.*** Special categories of cited documents:**

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Date of the actual completion of the international search

29 March 2000

Date of mailing of the international search report

05/04/2000

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Dailoux, C

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
DE 19708061	A	30-10-1997	DE	29604684 U	10-07-1997
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